JUN 1 3 1987

594-C-48 FEMA.209.540090

COMPLETED
17

FLOOD INSURANCE STUDY

ORIGINAL

TOWN OF WEST HAMLIN, WEST VIRGINIA
LINCOLN COUNTY

SEPTEMBER 4, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 540090

C010

BEST COPY AVAILABLE

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

BEST COPY AVAILABLE

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments	1
1.3 Coordination	1
2.0 AREA STUDIED	1
2.1 Scope of Study	1
2.2 Community Description	3
2.3 Principal Flood Problems	3
2.4 Flood Protection Measures	3
3.0 ENGINEERING METHODS	3
3.1 Hydrologic Analyses	4
3.2 Hydraulic Analyses	4
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS	5
4.1 Floodplain Boundaries	5
4.2 Floodways	6
5.0 INSURANCE APPLICATION	8
6.0 FLOOD INSURANCE RATE MAP	10
7.0 OTHER STUDIES	10

BEST COPY AVAILABLE

TABLE OF CONTENTS - continued

	Page
8.0 LOCATION OF DATA	10
9.0 BIBLIOGRAPHY AND REFERENCES	10

FIGURES

Figure 1 - Vicinity Map	2
Figure 2 - Floodway Schematic	8

TABLES

Table 1 - Summary of Discharges	4
Table 2 - Floodway Data	7

EXHIBITS

Exhibit 1 - Flood Profiles
Guyandotte River Panel 01P

Exhibit 2 - Flood Insurance Rate Map and Street Index

Exhibit 3 - Elevation Reference Marks

BEST COPY AVAILABLE

FLOOD INSURANCE STUDY
TOWN OF WEST HAMLIN, LINCOLN COUNTY, WEST VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of West Hamlin, Lincoln County, West Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE) during the preparation of the Flood Insurance Study for the unincorporated areas of Lincoln County, West Virginia. The work for that study was completed in January 1986.

1.3 Coordination

On April 24, 1986, the Town of Hamlin was notified by the Federal Emergency Management Agency (FEMA) of the initiation of a Flood Insurance Study for the community.

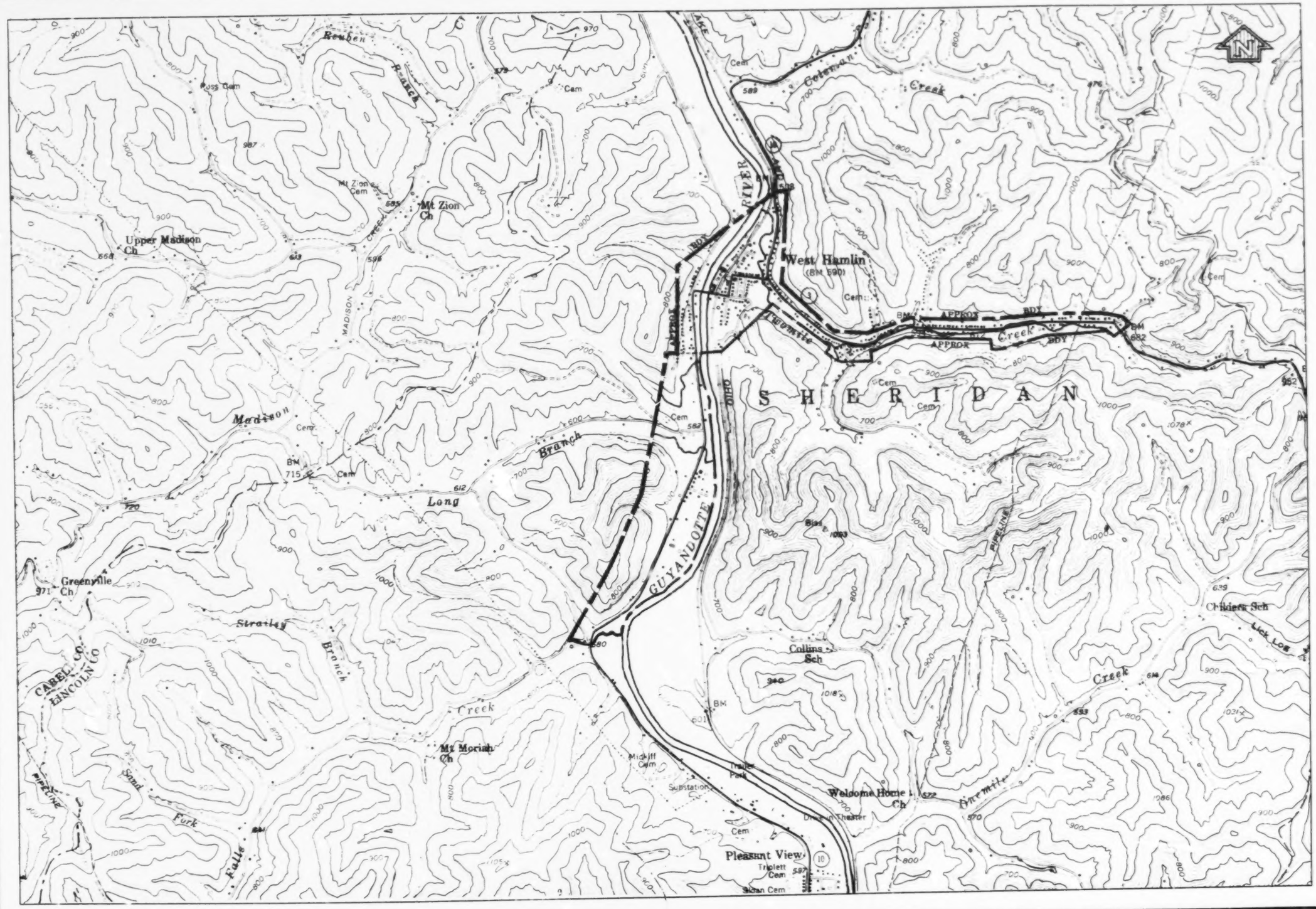
On October 30, 1986, a final Consultation and Coordination Officer's (CCO) meeting was held with FEMA and the community to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of West Hamlin, Lincoln County, West Virginia. The area of study is shown on the Vicinity Map (Figure 1).

BEST COPY AVAILABLE



APPROXIMATE SCALE
8000 FEET
4000
2000
0
2000

VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WEST HAMLIN, WV
(LINCOLN CO.)

FIGURE 1

BEST COPY AVAILABLE

The Guyandotte River was studied by detailed methods for its entire length affecting the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Twomile Creek and Long Branch were studied by approximate methods for their entire lengths affecting the community. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

2.2 Community Description

The Town of West Hamlin is located in northwestern Lincoln County in southwestern West Virginia. It is bordered by the unincorporated areas of Lincoln County on all sides and is within the magisterial district of Sheridan.

A major spur railroad of CSX Transport runs along the Guyandotte River, and State Routes 10 and 3 run the length of the town to intersect near the center of town.

2.3 Principal Flood Problems

Major floods on the Guyandotte River have occurred in 1934, 1948, 1950, 1955, and 1957.

2.4 Flood Protection Measures

The R. D. Bailey Dam and Lake Project, a multi-purpose reservoir located on the Guyandotte River, approximately 112 miles above the confluence and approximately 1 mile northeast of the community of Justice, was authorized by the Flood Control Act of 1962 (PL 87-874). The project became operational for flood control in June 1979.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a

BEST COPY AVAILABLE

specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedance) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

The hydrologic analysis for the Guyandotte River was taken from the Flood Insurance Study for the unincorporated areas of Lincoln County (Reference 1). Natural discharge-frequency curves used in that study were based on a regional analysis developed in accordance with the method outlined by Lec R. Beard and USGS Bulletin 17B (References 2 and 3).

A summary of the drainage area-peak discharge relationships for the Guyandotte River is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
GUYANDOTTE RIVER					
At the Lincoln County-Cabell County boundary*	1,252	20,900	31,700	35,700	48,400
At Branchland Gage*	1,226	20,000	30,500	35,400	46,800

*Located outside corporate limits

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data were determined using topographic mapping compiled from aerial photography at a scale of 1:2,400 with a contour interval of 5 feet (Reference 4). Below-water sections of the stream channels were field surveyed at all bridges. Cross sections were located at close intervals above and below bridges in order to compute the backwater effects from these structures. All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

BEST COPY AVAILABLE

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 5). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Guyandotte River were taken from the Flood Insurance Study for the unincorporated areas of Cabell County (Reference 6).

Roughness coefficients (Manning's "n") for water-surface computations were determined by characteristics of historical floods and existing floodplain conditions. Where information existed, "n" values were verified by reproducing known high-water profiles with the HEC-2 computer program. The channel "n" values for the Guyandotte River ranged from 0.034 to 0.052, and the overbank "n" values ranged from 0.050 to 0.060.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 7).

BEST COPY AVAILABLE

For the streams studied by approximate methods, the boundary of the 100-year flood was developed from field investigation, topographic maps, and the Flood Hazard Boundary Map for the unincorporated areas of Lincoln County, West Virginia (References 7 and 8).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this study was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodway is shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for the Guyandotte River extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

REST COPY AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Guyandotte River								
A	29.993	344/85	7,395	4.8	579.8	579.8	580.1	0.3
B	30.614	317/83	7,500	4.8	580.7	580.7	581.0	0.3
C	31.195	207/30	5,478	6.5	581.3	581.3	581.5	0.2

[1] Miles above confluence with Ohio River
[2] Width/width within corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

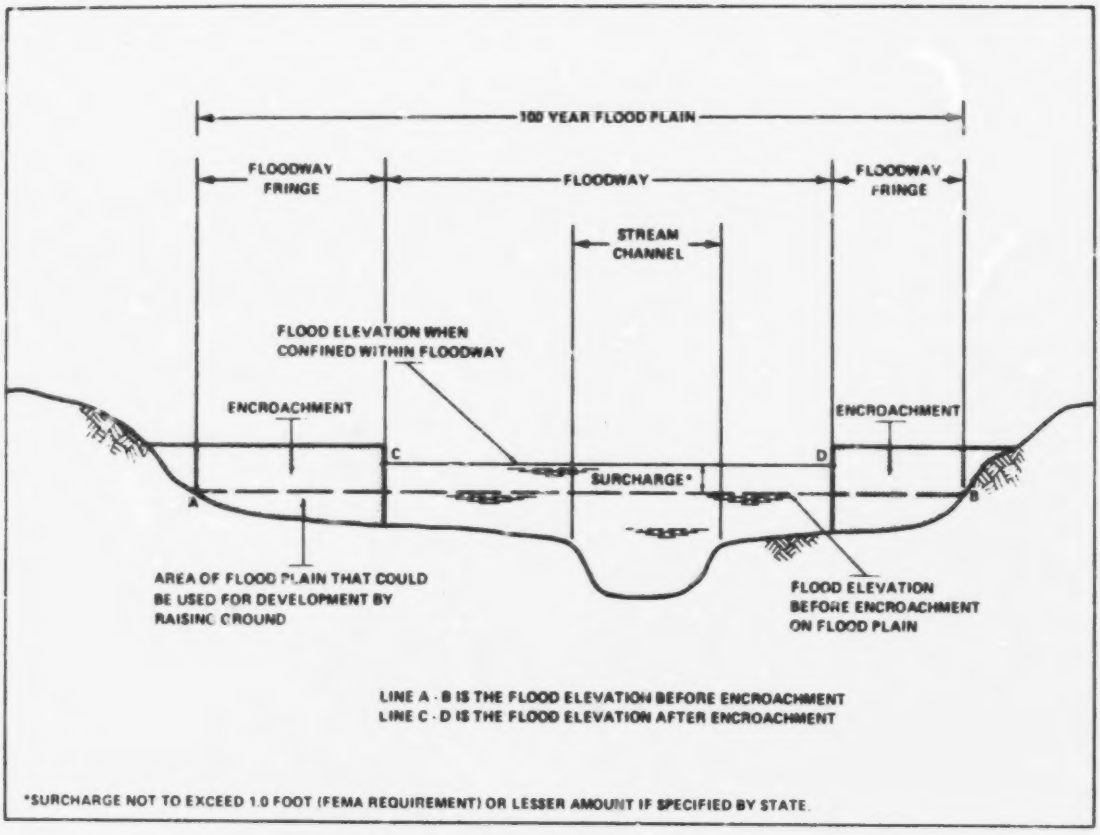
TOWN OF WEST HAMLIN, WV

(LINCOLN CO.)

FLOODWAY DATA

GUYANDOTTE RIVER

BEST COPY AVAILABLE


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC

Figure 2

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

BEST COPY AVAILABLE

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

BEST COPY AVAILABLE

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study for Lincoln County, West Virginia, is currently being prepared (Reference 1). The results of that study will be in exact agreement with the results of this study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Lincoln County, West Virginia (Unpublished).

2. Leo R. Beard, Statistical Methods in Hydrology, Sacramento, California, U.S. Army Corps of Engineers, January 1962.

3. U.S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

4. L. Robert Kimball and Associates, Topographic Maps compiled from aerial photographs, Ohio Coordinate System, South Zone, Scale 1:2,400, Contour Interval 5 feet: Lincoln County, West Virginia, April 11, 1984.

BEST COPY AVAILABLE

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

6. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Cabell County, West Virginia (Unpublished).

7. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: West Hamlin, West Virginia, 1958, photorevised 1976.

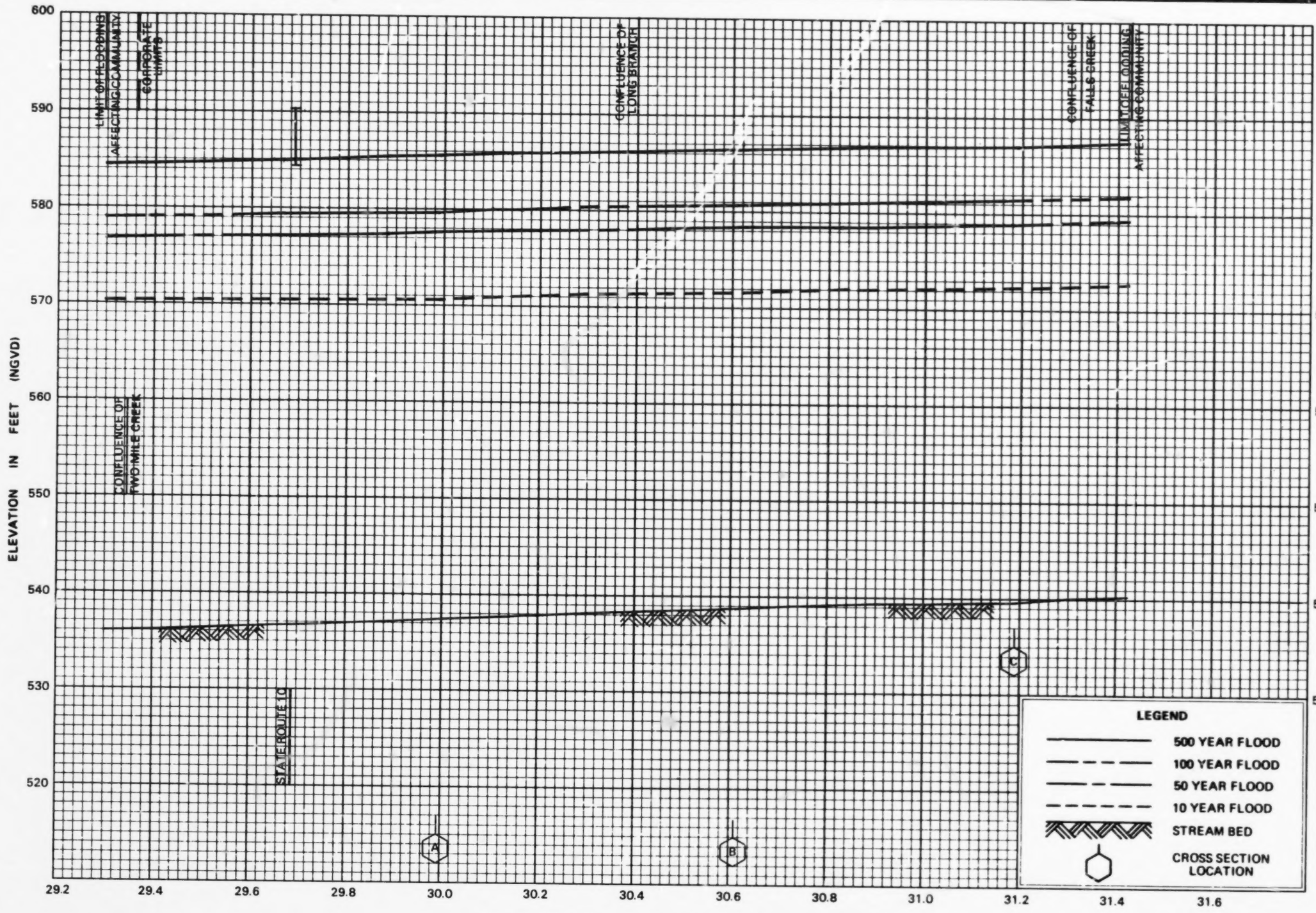
8. Federal Emergency Management Agency, Flood Hazard Boundary Map, Unincorporated Areas of Lincoln County, West Virginia, Washington, D.C., January 15, 1982.

BEST COPY AVAILABLE

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 1	590.78	Square cut on downstream right abutment of State Route 10 bridge over the Guyandotte River in Town of West Hamlin.
RM 2	581.32	Spike in pole at southwest corner of intersection of State Route 10 and County Route 10-1 (Falls Creek Road). Intersection is on west (left) bank of the Guyandotte River.

BEST COPY AVAILABLE



FLOOD PROFILES

GUYANDOTTE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF WEST HAMLIN, WV
(LINCOLN CO.)

01P

BEST COPY AVAILABLE